

REMARKS

By this amendment claims 1, 13, 19, and 24 have been amended to more particularly define the claimed inventions and distinguish over the prior art of record. Applicant respectfully submits that the above amendments do not add new matter to the Application and are fully supported by the specification, for example, at page 4, lines 18-29. Accordingly, claims 1-4, 13, 15, 18-20, and 24 are currently pending of which claims 1, 13, 19, and 24 are independent.

In view of the above Amendments and the following Remarks, Applicant respectfully requests reconsideration and timely withdrawal of the pending rejections of the remaining claims for at least the reasons discussed below.

Drawing Objections

The drawings are objected to under 37 C.F.R §§ 1.83(a), 1.84(p)(4), and for inconsistent cross-hatchings in FIG. 1A and FIG. 1B. FIG. 1A has been corrected so that 103A refers to the coil assembly, while 103A₁ refers to the contact surface. The Examiner also contends that 103A and 103B refers to the coils and that the cross-hatching used for those elements is not conventional for designating coils. But 103A and 103B designate coil assemblies, not the actual coils. Nevertheless, the drawings have been corrected to clearly designate the solenoid coils disposed upon the coil assemblies. Finally, the cross-hatchings in FIG. 1A and FIG. 1B have been corrected in accordance with the Examiner's helpful suggestions. Therefore, Applicant respectfully requests withdrawal of the objections to the drawings.

Accordingly, claim 24 is not anticipated by Neff because it fails to disclose each and every feature of the claimed invention as a whole. Neither Neff, nor any of the prior art of record, discloses or suggests the subject-matter of claim 24 for reasons similar to those discussed below. Hence, Applicant submits that claim 24 is allowable.

35 U.S.C. § 103 Rejections

Claims 1-4, 13, 15, and 18 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,992,821 to Rookes *et al.* in view of Neff. Applicant traverses this rejection for at least the following reasons.

Independent claims 1 and 13, as amended, recite a combination of features, including “a mechanism which at least minimizes fluid accumulation and hydraulic latching effects in a gap between an end of the spool and at least one of the opposing solenoid coils, said gap permitting said spool to slide along its longitudinal axis in said bore” (claim 1) and a “means for minimizing fluid accumulation and hydraulic latching effects between a contact surface area between the spool and one of the first and second solenoid coils” (claim 13).

The Office Action states at page 5 that Rookes discloses a housing 12 having solenoid coils 16, 18 and a valve member 14 positioned within a bore in the housing between the solenoid coils. But the Examiner acknowledges that Rookes fails to disclose at least a “mechanism which at least minimizes fluid accumulation.”

To overcome the deficiencies of the cited reference, the Office Action combines Rookes with the valve spool of Neff in an attempt to reach the claimed invention as a whole.

To establish a *prima facie* case of obviousness, however, there must be a suggestion or motivation to combine the references as suggested by the Office Action. (See MPEP § 2143). The motivation to combine references may be found in “the nature of the problem to be solved, the teachings of the prior art, and the knowledge of person of ordinary skill in the art.” (See MPEP § 2143.01 (citing *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998))). Applicant respectfully submits that there requisite motivation or suggestion to combine references in the manner proposed by the Examiner is lacking.

None of the references relied upon in the Office Action contemplate hydraulic latching effects in fuel injectors. As discussed above, the valve spool 73 of Neff is always in contact with the operating rod 136 of solenoid 75. Neff also discloses a poppet valve for use in air flow lines, and the O-rings 114, 134 sealingly engage the surface of the bore 106 to prevent leakage of air to ambient. Hydraulic latching effects cannot occur in the poppet valve of Neff due to both the absence of liquid and absence of separation between the valve spool 73 and solenoid 75.

Further, Rookes does not discuss hydraulic latching effects. While Rookes does mention that magnetic latching effects can lead to “undesirable switching delays” (col. 1: 37-43), nowhere are hydraulic latching effects caused by the accumulation of fluid at the ends of the valve member discussed. Applicant respectfully submits that because the references do not even discuss the hydraulic latching problem, they cannot suggest the claimed solutions. Therefore, the Office Action and the references cited therein fail to provide the required suggestion or motivation required to maintain a *prima facie* case of obviousness.

Moreover, these references cannot be combined because they actually teach away from their combination. (See MPEP § 2145 (citing *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir.

1983)). Rookes specifically criticizes the use of poppet valves in modern fuel injection systems because they do not offer “sufficiently fast switching rates” and they suffer from ““valve bounce”” that adversely affects fluid control. (Col. 1: 10-22). Accordingly, a person of ordinary skill in the art would not combine Neff with Rookes because of its explicit teachings regarding the deficiencies of poppet valves for use in modern fuel injectors.

As a result, the Office Action fails to establish a *prima facie* case of obviousness because the combination of references suggested by the Examiner is improper. Therefore, Applicant respectfully requests that the rejection of claims 1 and 13 under § 103(a) be withdrawn.

Claims 19 and 20 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,964,406 to Zuo in view of Neff. Applicant also traverses this rejection for at least the following reasons.

In the previous Final Office Action mailed July 1, 2005, claims 19 and 20 were rejected as allegedly being unpatentable over Zuo in view of U.S. Patent No. 5,133,386 to Magee. In its September 12, 2005 reply, Applicant asserted that the Examiner improperly relied solely upon the level of skill in the art to provide the requisite motivation to combine Zuo and Magee. Subsequently, the Examiner withdrew the final rejection of claims 19 and 20.

Now, the Examiner attempts to combine the valve spool of Neff to overcome the deficiencies of Zuo. Independent claim 19, as amended, recites “a mechanism which at least minimizes fluid accumulation between an end of the spool and at least one of the first and second solenoid coil to reduce or minimize hydraulic latching effects.” The Office Action does not refute Applicant’s previous assertion in its September 12, 2005 reply that Zuo lacks any motivation or suggestion regarding the desirability of preventing latching effects. Thus,

Applicant has clearly established that Zuo does not address the problem of latching effects in fuel injectors. Also, as noted above, Neff fails to provide the required motivation or suggestion to combine the references in the manner proposed by the Examiner. Accordingly, the combination of Zuo in view of Neff is improper and the rejection of claim 19 under § 103(a) should be withdrawn.

Accordingly, for at least the reasons discussed above, Applicant respectfully submits that claims 1, 13, and 19 are allowable over the prior art of record. Moreover, claims 2-4, 15, 18, and 20 are also allowable by virtue of their dependencies on allowable claims 1, 13, and 19, as well as for reciting additional patentably distinct features. None of the prior art of record, whether taken alone or in combination, discloses or suggests the inventions defined by these claims. Thus, Applicant respectfully requests allowance of all the pending claims.

Piecemeal Examination

Applicant notes that MPEP § 707.07(g) states that “[t]he Examiner ordinarily should reject each claim on all valid grounds available, avoiding, however, undue multiplication of references.” In conducting the search, the Examiner should avoid “[m]ultiplying references, any one of which is as good as, but no better than, the others,” as such multiplication “adds to the burden and cost of prosecution.” (*See* MPEP § 904.03). Applicant is concerned that prior grounds of rejection essentially have been repeated in the Office Action based on new references that are no better than the previously relied-upon references, and that the Examiner attempted to combine references in a case where the primary reference (Rookes) specifically criticized the type of valve used in the secondary reference (Neff). While Applicant has amended the claims

to emphasize the hydraulic latching features of the invention, the Examiner is required to perform a complete search of the “invention,” and this feature has been asserted throughout prosecution. (*Id.*)

Indeed, while independent claims 1, 13, 19, and 24 have been amended to recite “hydraulic” latching effects throughout to more particularly define the invention over the prior art, this feature has been inherent and these amendments do not narrow the scope of the claims. Each of the claims previously recited reducing or minimizing the fluid accumulation at the ends of the longitudinally slidable spool that causes hydraulic latching effects. Accordingly, Applicant respectfully requests that the Examiner follow the policy outlined in the MPEP and avoid further piecemeal prosecution.

CONCLUSION

In view of the foregoing Amendments and Remarks, Applicant submits that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above Application to issue. If necessary to expedite prosecution, the Examiner is invited to contact Applicant's counsel at the telephone number listed below. Applicant hereby makes a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to **Deposit Account No. 23-1951.**

Respectfully submitted,



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